

special peculiarities of high climates with more genial warmth than those already referred to.

In South America the Andes have been extensively used. Here the high altitudes and medium elevations are warm and pleasant, but the more extreme heights are apt to be made chilly and disagreeable from the condensation of moisture that occurs from the sea winds. In these mountains fog is more common than it is in the mountains of North America at like altitudes.

In Europe the Alps have been extensively used. Here the snow line is much lower, and the cold more pronounced. As most of the resorts are situated in valleys among the snow-clad peaks, and not so far removed from the ocean as in North America, there is more dampness in summer, and more melting snow and precipitation in the spring and autumn. They have, however, the advantage over the plateau resorts of North and South America in having less wind and dust.

The high altitudes of Australia and South Africa are only just beginning to be adapted for use by delicate invalids.

In Asia the Himalayas present fine climates for invalids, but the best of them are on the northern slopes, away from the influence of the monsoons, and are at present not sufficiently civilized to be available.

S. E. Solly.

ALUM, POISONING BY.—Cases of poisoning by this drug are rare. The symptoms appear very soon after the poison has been swallowed. There is severe pain in the œsophagus and stomach, followed by vomiting, often of blood; sanguineous discharges from the bowels, and all the symptoms of a violent gastro-enteritis. The pulse is small and frequent; there is muscular tremor with great weakness; thirst is sometimes excessive, and swallowing is difficult and painful; the body temperature is lowered. Death may occur in syncope. Alkalies and their carbonates and calcined magnesia are the antidotes for alum. After the immediate danger has passed away, the gastro-enteric inflammation remains to be treated on general principles. Chronic alum poisoning is manifested by gastric disturbance and constipation. It is to be treated by first removing the cause, and then combating the effects by means of laxatives and stomachics.

ALUM ROCK SPRINGS.—Santa Clara County, California.

ACCESS.—From San José by carriage seven miles northeast. Hotel.

These springs are located on the western slope of the coast range in a romantic cañon with a most unromantic name—Penitentiary Cañon,—so-called in consequence of the early Jesuits assembling there to do penance. The nearness of the springs to San José and the excellent accommodations offered at the hotel, with the many natural advantages of climate and scenery, make the Alum Rock Springs a favorite resort for tourists, summer visitors, and invalids. The summer temperature is rarely above 90° F., and in the winter it is never too low for comfort. Trout and mountain quail abound, affording good sport for rod and gun. Several springs are in activity at Alum Rock. The principal "soda" or drinking water spring was found by Dr. Anderson to contain the following ingredients:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sodium carbonate	7.14
Sodium chloride	10.21
Potassium carbonate	0.76
Magnesium carbonate	8.82
Magnesium sulphate	7.16
Calcium carbonate	19.05
Manganese carbonate	Trace.
Ferrous carbonate	Trace.
Alumina	6.45
Silica	2.52
Total	62.21
Free carbonic acid gas, excess.	

This water is of the alkaline-saline-carbonated variety with strongly marked aluminous properties. A chalybeate spring at Alum Rock was analyzed some years ago by Professor Hatch, with the following results:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Ferrous oxide	0.30
Alumina	0.15
Manganese	0.70
Soda	3.40
Potassa	0.20
Chlorine	1.60
Hydrosulphuric acid	3.30
Total	9.65

The salts and elements of this analysis are evidently reduced to an anhydrous state. The same analysis with the water of crystallization would probably yield a much heavier residue.

At Alum Rock there are two thermal sulphur springs which have a temperature of 85° F. They are used for bathing purposes.

The waters at this resort have gained considerable reputation in the treatment of anæmia, chlorosis, chronic malaria, nervous prostration, and debility. They ought, furthermore, to be useful in the hemorrhagic diathesis, in menorrhagia, etc., on account of the iron, alum, and acids which the waters contain. James K. Crook.

ALUM ROOT.—(*Heuchera*.) Under this name the rhizome of *Heuchera Americana* L. is used as a simple astringent, by reason of the fourteen per cent. of tannin, which it contains. It is a crooked, tuberculate rhizome, five or six inches long and half an inch thick, of a purplish or reddish color, within and without. The plant grows abundantly in the Eastern United States and is represented through the West by other species of the genus, with similar composition and properties. The dose is from 1 to 4 gm. (gr. xv.–lx.). Either water or alcohol will extract its tannin. H. H. Rusby.

ALUMINUM.—1. GENERAL MEDICINAL PROPERTIES OF THE COMPOUNDS OF ALUMINUM.—As compared with the majority of the heavy metals, aluminum exerts but an insignificant constitutional action—one useless in medicine, and not certainly recognizable even in poisoning by aluminum compounds. All the evidence there is of constitutional action by this metal is that, in toxic doses of alum, there have been observed along with the symptoms of local irritation, tremors, spasms, fainting fits, and, in one case, death, with disproportionately slight local lesions. Locally, aluminum compounds are astringent—the freely soluble, such as alum, highly so, but yet with less conjoint irritation than is usual with astringent metallic salts. The main therapeutic use of aluminic preparations is for a local astringent effect, for which purpose these compounds combine potency with freedom from bad taste, undue irritation, or power to stain.

2. THE COMPOUNDS OF ALUMINUM USED IN MEDICINE.—These are the hydroxide, sulphate, and potassio-sulphate (potassium alum).

Aluminium hydroxide, $Al_2(OH)_6$.—Aluminum hydroxide, or hydrated alumina, as it is commonly called, is official in the U. S. P. as *Alumini Hydras*, Aluminum Hydrate. It is prepared by precipitation, a boiling hot aqueous solution of alum being poured into a similarly hot solution of sodium carbonate. The precipitate of the hydroxide is then washed with hot distilled water, drained, dried, and pulverized. The product is "a white, light, amorphous powder, odorless and tasteless, and permanent in dry air. Insoluble in water or alcohol, but completely soluble in hydrochloric or sulphuric acid, and also in potassium or sodium hydrate T. S. When heated to redness it loses about 34.6 per cent. of its weight (water of hydration)" (U. S. P.). This preparation, from its insolubility, can exert active properties only through chemical conversion. Locally

applied, it operates as an absorbent powder, developing, possibly, a faint astringency. Its employment is almost exclusively German, and consists in its application to the skin in inflammatory affections.

Aluminium sulphate, $Al_2(SO_4)_3 + 16H_2O$. The salt is official in the U. S. P. as *Alumini Sulphas*, Aluminum Sulphate. It occurs as "a white, crystalline powder, without odor, having a sweetish and afterward astringent taste, and permanent in the air. Soluble in 1.2 parts of water at 15° C. (59° F.), and much more freely in boiling water, but insoluble in alcohol. When gradually heated to about 200° C. (392° F.), it loses its water of crystallization (45.7 per cent. of its weight). The salt has an acid reaction upon litmus paper" (U. S. P.). Aluminum sulphate is powerfully astringent, and also antiseptic. Its use is local only, as a conjoint astringent and detergent, or, in saturated solution, as even a mild caustic in simple hyperplasiæ.

Potassio-aluminium sulphate, $K_2Al_2(SO_4)_4 + 24H_2O$. This double salt is official in the U. S. P. as *Alumen*, Alum. Alum is in "large, colorless, octahedral crystals, sometimes modified by cubes, or in crystalline fragments, without odor, but having a sweetish and strongly astringent taste. On exposure to the air, the crystals are liable to absorb ammonia, and acquire a whitish coating. Soluble in nine parts of water at 15° C. (59° F.), and in 3.3 part of boiling water; it is also freely soluble in warm glycerin, but is insoluble in alcohol. When gradually heated, it loses water; at 92° C. (197.6° F.) it melts, and if the heat be gradually increased to 200° C. (392° F.) it loses all its water of crystallization (45.52 per cent. of its weight), leaving a voluminous, white residue. The salt has an acid reaction upon litmus paper" (U. S. P.). Alum is decomposed by the alkalies and their carbonates, lime, magnesia and its carbonates, potassium tartrate, and lead acetate. The salt is highly astringent, and, internally, in dose of from 4 to 8 gm. or more (3 i. or ij.), is promptly and efficiently emetic, with little nausea or depression. In large concentrated dosage it is an irritant poison, but death is rare. Alum is principally employed locally as an astringent. For limited application to an accessible part a smooth crystal may be swept over the surface, but more commonly aqueous solutions are used, ranging in strength from one-half of one per cent. to three or four per cent., according to the sensitiveness of the part. A domestic but serviceable form of application is *alum curd*, made by boiling alum in milk, one part to sixty, until coagulation ensues, then straining and applying the curds like a poultice, between layers of fine linen. Or the curd may be obtained by mixing 2 gm. (gr. xxx.) of powdered alum with the white of an egg. Alum may be used almost universally for astringent purposes, except that as a gargle it is objectionable because of an injurious action upon the teeth, and as a collyrium because of its attacking and softening the tissue of the cornea wherever the protective influence of the epithelium may be wanting, as in case of abrasion or ulcer.* Internally alum may be used as an emetic in the doses stated above, and has been held for a century—off and on—to be of peculiar avail in lead colic, abating all the symptoms, even to breaking the tendency to constipation. For internal astringent medication alum is nowadays comparatively seldom used, other astringents being preferred. The dose of alum is from 0.30 to 1.00 gm. (gr. v.–xv.) in powder, with sugar and an aromatic, or in mixture with honey or molasses. Or *alum whey* may be given—simply the whey left after straining out the curds in the preparation described above. Such whey may be given by the wineglassful. These various dosings may be repeated three or four times a day, or, in lead colic, given even hourly.

As has been already said in the quoted description of alum, the salt parts with water of crystallization when heated to about 200° C. Such heating of effloresced alum, continued till the alum has been reduced to a

* John Tweedy: The Practitioner, November, 1883, p. 331.

standard weight, is ordered by the U. S. P., and the product, pulverized, is entitled *Alumen Erisiccatum*, Dried Alum, more commonly called *burnt alum*. Dried alum is "a white, granular powder, without odor, possessing a sweetish, astringent taste, and attracting moisture on exposure to the air. It is very slowly but completely soluble in twenty parts of water at 15° C. (59° F.), and quickly soluble in 0.7 part of boiling water" (U. S. P.). Dried alum dissolves more slowly in water than the crystalline salt, but is, yet, physiologically much more active, for it is powerfully astringent even to causticity, and its use is, applied dry, to cauterize exuberant granulations or unhealthy ulcers, or to repress hemorrhage as from a leech bite or tooth socket. Edward Curtis.

ALUMNOL.—Beta-naphthol-disulphonate of aluminum—aluminum naphthol sulphonate, $Al_2[C_{10}H_7OH(SO_3)_2]_2$. This is a white powder obtained by the action of sulphate of aluminum on beta-naphthol barium disulphonate. It is freely soluble in water and glycerin, the solutions having a bluish fluorescence and becoming dark on exposure to light and air; it is also slightly soluble in alcohol, and it precipitates albumen and gelatin, the precipitate being soluble in excess of either. Alkalies cause the formation of a flocculent precipitate of aluminum hydroxide.

Alumnol combines the astringency of alum with the antiseptic power of naphthol. Externally it may be applied to ulcers and wounds, having a strong tendency to check exuberant granulations and to stimulate healing. Although it coagulates albumen, it does not form a slough in the wound if spread thinly, because the precipitate formed is soluble in excess of albumen. For such local application it may be employed in from two to ten per cent. strength, diluted with starch or talc. For abscesses a ten-per-cent. solution has been used as a dressing. Applied in one-half to two-per-cent. solution as a spray it is very efficacious in ordinary catarrhal conditions of the nasal and pharyngeal mucous membranes, lessening the congestion and the œdema and relaxation of the soft palate and uvula. For insufflation in chronic rhinitis or laryngitis, a ten to twenty per-cent. snuff with camphor and starch may be used.

In gonorrhœa a solution of from one-half to four per-cent. strength may be injected into the urethra, after the acute symptoms have subsided. Alumnol has been suggested as an intestinal astringent, but data concerning its internal use are wanting. W. A. Bastedo.

ALVELO.—The milky, resinous juice of *Euphorbia heterodoxa* Müller. It is indigenous to Brazil and belongs to the order *Euphorbiaceæ*, which comprises a very large number of plants, all more or less acrid and poisonous, and containing oily or resinous juices. Croton oil, curcas, and caoutchouc are obtained from members of this order.

Alvelos, or alveloz, obtained by expression, is yellowish white, of syrupy consistence, resembling vaseline, insoluble in water and alcohol, soluble in ether, miscible with fixed oils. It may be preserved with salicylic acid, or the resin may be obtained by precipitating with water. It possesses escharotic properties, and exerts a solvent action on organic tissues. It combines the effects of a caustic with the digestive action of papaine. It is recommended for the treatment of syphilitic and cancerous growths. After the part has been washed with carbolic acid or other antiseptic solution, it is to be painted with the drug once a day. The operation is repeated until the disease is removed. It is said that the purity of the drug may be known by its imparting a pronounced color and odor to the urine. This effect, which is due to the absorption of the drug, must be watched for during its use, as when prolonged it exerts a decided irritant action on the renal tissue. Beaumont Small.

AMARYLLIDACEÆ.—(The Amaryllis family.) A family of some seventy genera, growing chiefly in tropical or warm countries, and very largely cultivated

for floral decoration. Many species, especially of the narcissus group, are known to be poisonous. They are almost unknown to medical literature, but the agave or century plant is an important source of fermented and distilled liquor in Mexico. The family may be expected to yield important additions to the materia medica.

H. H. Rusby.

AMBER.—Succinum. (Preparation: *Oleum Succini*, U. S. P.).

A fossil resin produced by *Pityoxylon succiniferum* Kr. (*Picea succinifera* Conventz), and other tertiary and long ago extinct *Coniferae*. The range of these trees must have been a considerable one, as amber has been found in many widely separated places—Siberia, Alaska, Greenland, Maryland, in the United States, and in nearly all quarters of Europe. But the tract now covered by the Baltic Sea must have produced these trees in the greatest abundance, for from its southern borders nearly all the amber of commerce is, and for many centuries has been, obtained. The west coast of Denmark, and nearly the whole north coast of Prussia is included in this amberiferous region. It is continually found cast upon the shores by the waves, especially after heavy storms, either loose or entangled in the "roots" of *fuci* and other marine algae; it is also fished up from the bottom; and finally, large quantities are dug out of a stratum of glauconitic sand, "blue earth," underlying layers of peat and marl, and extending often far beneath the bed of the sea. It is assorted into numerous grades, according to its purity and size. The finest pieces are cut and polished for articles of ornament, the small and unsightly ones, with the chips and cuttings, are made into varnishes and various compositions, or distilled for the oil.

Amber is found in hard, brittle tears and lumps of more or less rounded but often irregular shape. They are usually small, rarely exceed a few grams in weight, and vary very much in clearness and transparency. They often contain coarse impurities, vegetable remains, and dirt. Occasionally entire insects are beautifully preserved in them. The color of amber is generally yellow or brownish, but varies from almost white to nearly black; it is rarely greenish. The external or natural surface is usually rough or irregular, the interior often beautifully transparent. It is harder than most resins, has no odor or taste, break with a conchoidal fracture, and is capable of receiving a high polish.

It is insoluble in water and cold alcohol, but may be dissolved in boiling alcohol, benzol, etc. It softens at a moderately high temperature, but does not melt until 29° C., when it begins also to decompose. Composition, C₁₀H₁₀O, and hydrocarbons.

The use of amber itself in medicine is long past. It is sometimes an ingredient of fumigating powders or pastilles; directions also for making an ethereal tincture are in pharmaceutical works. The oil of amber (*Oleum Succini*, U. S. P.) is an empyreumatic liquid, obtained by dry distillation and purified by distillation from water. The crude oil is a mixture of hydrocarbons and acids; a thick, dark-red, offensive-smelling liquid. The redistilled is pale or white, "a colorless or pale yellow, thin liquid, becoming darker and thicker by age and exposure to air; having an empyreumatic balsamic odor, a warm, acrid taste, and a neutral or faintly acid reaction. Specific gravity about 0.920. It is readily soluble in alcohol," etc. (U. S. P.). It is extensively adulterated. Internally used—*dose*, 2 to 5 dgm. (0.2 to 0.5 gm. = ʒiij. ad viij. = gtt. 5 to 15)—it is said to be stimulant and antispasmodic. Externally it is rubefacient, and is occasionally used as an ingredient of liniments. The residual pitch, "amber resin," left after the distillation of the oil, is dissolved to make a slowly drying, but very hard and durable varnish. Succinic acid is also one of the products of the disintegration of amber.

ALLIED PLANTS.—For other *Coniferae* see *Turpentine*.
ALLIED DRUGS.—Oil of tar is chemically and therapeutically analogous to oil of amber. Copal, kauri, and other fossil resins are strictly analogous products.

W. P. Bolles.

AMBERGRIS.—(*Ambre gris*, Codex Med.; *Ambra grisea*, i. e., gray amber.) A peculiar fatty material, found in lumps, generally on the surface of tropical seas; occasionally in the intestines of the sperm-whale, *Physeter macrocephalus* Shaw, where it is supposed to be a pathological formation. The balls are often of concentric structure, and in appearance and position are analogous to concretions found in other animals. Pieces vary in size from small fragments to great masses of 50 kgm. (100 lbs.) or more. It is a waxy, tasteless substance, crumbling, but also softening in the hand, having about the consistency of some gall stones, its color usually grayish or brownish, streaked or spotted with white. Odor slight, peculiar, not nauseous. At the temperature of boiling water it melts, and at a higher one is dissipated, leaving but little residue. Soluble in alcohol, ether, fixed and essential oils, etc.

Ambergris consists to the extent of about eighty-five per cent. of a peculiar non-saponifiable, crystallizable fat, *ambrein*, besides small amounts of extractive, benzoic acid, etc.

Ambergris has been used as an antispasmodic of the musk type, but is probably weaker than that. Its medical use is nowadays not worth serious thought. In perfumery, like musk, it has the property of holding and developing the vegetable odors.

The dose may be accepted as from 0.25 to 1 gm. (= gr. iv. ad xvi.). A tincture would be a suitable form.

W. P. Bolles.

AMBLER SPRINGS.—(Formerly Griffin's Springs.) Pickens County, South Carolina.

POST-OFFICE.—Pickens Court House. Hotel. These springs are two in number, and are located seven miles from Pickens Court House, at a level of 2,000 feet above the sea. They are used to some extent as a resort, and the water is bottled and sold. The Ambler House is one mile from the springs. It is kept open for the reception of guests during the summer months. The water was analyzed in 1895 by M. B. Hardin, chief chemist of the Clemson Agricultural College, as follows:

ONE UNITED STATES GALLON CONTAINS:	
Solids.	Grains.
Sodium carbonate.....	0.80
Calcium carbonate.....	2.15
Magnesium carbonate.....	0.65
Potassium sulphate.....	0.51
Sodium sulphate.....	0.18
Sodium chloride.....	0.37
Iron sesquioxide and alumina.....	0.02
Silica.....	1.78
Total.....	6.46

This water is of the light alkaline-calcic class. It is not heavily mineralized, but nevertheless it has been used with much apparent advantage in dyspepsia, and in skin disorders of the eczematous variety.

J. K. Crook.

AMBULANCES, CIVIL.—An ambulance is a vehicle specially designed for the transportation of sick or wounded. It owes its origin and general characteristics to the needs of civilized warfare. The growth of humane practices in the wars of the eighteenth century produced an increasing demand for some method of carrying wounded both effective and merciful, and the French wars following the Revolution of 1789 brought the ambulance service along with all their other military innovations.

An organized system for the transportation of wounded was first introduced by Baron Larrey, the French military surgeon, in the Army of the Rhine in 1792. Only slight improvement upon his system was made during the wars of the first half of the nineteenth century, and it was not until the latter part of the Civil War that the ambulance obtained proper recognition and development

in the introduction of a uniform system by act of Congress in March, 1864.

The need for civil ambulances, though increasingly felt, was, of course, in these earlier days less urgent, but shortly after the close of the war a modified system adapted for use in cities was recognized to be an important requirement of a well-organized hospital system; its adoption was repeatedly discussed in several of the hospitals of New York City, and in December, 1869, the first service was established by the Commissioners of Charities and Corrections in Bellevue Hospital. Though crude and limited at first, the Bellevue service was rapidly improved and extended, and was soon copied by the other hospitals of New York.

Important modifications in the army type were, of course, required in the adaptation of the ambulance to

introduced as fast as means permitted or the conditions of each case required. The New York system was, of course, the most extensive and elaborate. In some of the smaller cities, such for instance as New Haven, where the number of hospitals is small, ambulances are few and are used chiefly for sick cases; their emergency use is restricted to a small area surrounding the hospital. Accident cases in other parts of the city are attended to by the police patrol, which still performs in a rudimentary way the functions of an ambulance service proper. It is not so easy to understand why this use of patrols should survive in large cities, such as Philadelphia and Cincinnati, where it still continues, although there are unquestionably abuses of the ambulance system (hereafter touched upon) which are avoided when the duty is performed by the police. The New York service is the



Fig. 91.—Horse Ambulance.

civil hospital work. The necessary changes were apparent and were quickly made; the civil could be lighter, and therefore faster, than the army vehicle on account of better thoroughfares; it would not be required to carry so many people, but for use in narrow and crowded streets it must be able to turn in the arc of a small circle. Since the differentiation in the types of the two wagons in the more fundamental particulars referred to, the evolution of the civil ambulance has been along lines chiefly of mechanical construction, which do not require our attention here. The only radical improvement made in the last fifteen years has been in the introduction of rubber tires, and ambulances wherever established are now practically similar in point of construction and arrangement; nor is it likely that further changes will be made except those common to every kind of light transporting vehicle, such as the recent adoption of rubber tires and the pending changes of mechanical for horse power.

The advantages of an ambulance system commended themselves to the hospital authorities of every city of consequence in the United States, and ambulances were

most elaborate and enterprising, and will probably remain as the standard for this country.

The eagerness of foreign medical authorities to accept American innovations effecting improved conditions of service, especially of a mechanical character, has never been marked, and, in the case of the ambulance system, amounts almost to disinclination. For one thing, the foreigner does not feel the constantly expressed desire of the American for rapidity of transit of all kinds. The hurry call for fire and for accident relief does not seem to him so urgent, and the ambulance is not to be found in his medical traditions. On the Continent ambulances are so rare as almost to be non-existent, and litter, delivery wagons requisitioned for the exigency, and police patrols are commonly used. No ambulance system worthy of the name can be found. In London it is to be expected that they are somewhat more commonly used than on the Continent, though the service seems in a crude state of development. The ambulances are few and far apart, and, therefore, totally inadequate to the needs of the service. Reliance is still placed, to a large extent, especially in the matter of accident calls, upon